

**REMARKS/ARGUMENTS****1.) Claim Amendments**

The Applicant has amended claims 8 and 11. Claims 12-14 have been added. Accordingly, claims 2-14 are pending in the application. Favorable reconsideration of the application is respectfully requested in view of the foregoing amendments and the following remarks.

**2.) Claim Rejections – 35 U.S.C. § 103 (a)**

In paragraph 8 of the Office Action, the Examiner rejected claims 2, 8-9 and 11 under 35 U.S.C. § 103(a) as being unpatentable over Grube (US 5,619,505) in view of Yong (IEEE). The Applicant has amended the claims to better distinguish the claimed invention from Grube and Yong. The Examiner's consideration of the amended claims is respectfully requested.

The Examiner states that Grube discloses a method of modulating and demodulating digital data using Discrete Multi-Tone (DMT) for bidirectional data transmission via two-wire line in time division multiplexing. The Examiner further states that Grube, however, fails to disclose a frame, which is divided into uplink and downlink slots, and a time management unit for enabling the transmitter or the receiver. The Examiner contends these features are shown by Yong, and that it would be obvious to one skilled in the art to combine Grube and Yong to achieve the claimed invention.

The Applicant, however, is unable to discern where Grube discloses time division multiplexing of the DMT transmissions. The Examiner indicates that this is shown in FIGS. 6-8, refs. 122 and 124. FIGS. 6 and 7, however, show an ADSL transmitter and ADSL receiver, respectively, which each interface with a splitter through a DMT modulator. At the time the present application was filed, ADSL transmitters and receivers used frequency division multiplexing of transmit and receive data, and there is no disclosure or suggestion of time division multiplexing in the discussion of FIGS. 6 and 7 (see col. 3, line 57 through col. 4, line 29). Additionally, FIG. 8 shows a communication system in which a primary site 102 communicates with a plurality of

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secondary sites 104, 106, and 108 using DMT, but once again, there is no disclosure of time division multiplexing. Instead, in col. 7, lines 1-15, Grube states:

The primary site communicates with the plurality of secondary sites via inbound and outbound low pass transmission paths. This is done via the respective DMT receivers and DMT transmitters, wherein the DMT transmitter transmits information over a plurality of carrier channels to a targeted DMT receiver. The information transmitted may be control information, i.e., the co-ordination information used by the primary site and the secondary sites to establish data transfers, or user information, i.e., the information intended for a subscriber of the communication system. To convey this information, the DMT transmitter formats the user information and then converts it into DMT symbols, which is the actual information transmitted over the low pass transmission path. The DMT receiver receives the DMT symbols, deformats it to recapture the original information.

There does not appear to be any disclosure in FIGS. 6-8 of time division multiplexing of the DMT information. The Applicant notes that Grube discusses the use of TDMA techniques to provide access to a plurality of secondary sites. However, Grube limits this discussion to a method of providing sequential access to an inbound carrier channel by having the secondary sites take turns accessing the channel. (Col. 20, lines 53-61; col. 21, lines 29-46). The fact that Grube does not suggest that TDMA techniques could be used to time division multiplex the DMT information, even though Grube was aware of TDMA techniques, is strong evidence that this aspect of the Applicant's claimed invention would not have been obvious to a person skilled in the art at the time the invention was made. Therefore, combining Grube with references that disclose the use of TDMA, does not render the claimed invention obvious.

The Applicant concurs with the Examiner's further statement that Grube fails to disclose a frame, which is divided into uplink and downlink slots, and a time management unit for enabling the transmitter or the receiver. However, the Applicant disagrees that these features are taught by Yong.

Yong discloses a time division duplex (TDD) method of managing unbalanced uplink and downlink traffic in an RF communication system. However, there is no suggestion in Yong that time division multiplexing could be used over a twisted pair

using DMT transmitters and receivers. As noted above, this aspect of the Applicant's claimed invention was not suggested by Grube, even though Grube disclosed the use of TDMA techniques to provide access to a carrier channel to a plurality of secondary sites.

The Applicant has amended claim 8 to recite a method of bidirectionally transmitting digital data via a two-wire line between a first station and a second station. The method includes the steps of modulating and demodulating the digital data using discrete multitone modulation, and separating digital data to be transmitted and digital data to be received by time division multiplex operation. The separating step includes the steps of subdividing an associated multiplex time frame into a predeterminable number of time slots,  $N$ ; assigning a first subset,  $K$ , of the time slots exclusively to one transmission direction; and assigning a second subset,  $N-K$ , of the time slots comprising the remaining number of time slots in the multiplex time frame exclusively to the other transmission direction. The method then transmits the digital data bidirectionally between the first station and the second station via the two-wire line utilizing the subdivided multiplex time frame, wherein only one of a transmitting operation and a receiving operation is performed at any given time in each station.

As noted above, Grube fails to show the recited features of time division multiplexing of the DMT information, a frame divided into uplink and downlink slots, and a time management unit for controlling the transmitter and receiver in each station so that they do not operate at the same time. Yong also fails to disclose time division multiplexing over a twisted pair using DMT transmitters and receivers. Yong's general disclosure of TDD, when combined with Grube, does not render the claimed invention obvious since Grube also disclosed the use of TDMA techniques for other purposes, but failed to suggest the use of time division multiplexing for the DMT information. Therefore, the withdrawal of the rejection and the allowance of amended claim 8 are respectfully requested.

Claims 2 and 9 depend from amended claim 8 and recite further limitations in combination with the novel elements of claim 8. Therefore, the allowance of claims 2 and 9 is respectfully requested.

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System claim 11 has been amended similarly to method claim 8. Amended claim 11 recites a system for bidirectionally transmitting digital data via a two-wire line between a first station and a second station. The system includes means within the first and second stations for modulating and demodulating digital data using discrete multitone modulation, and a time management unit within the first and second stations for separating digital data to be transmitted and digital data to be received by time division multiplex operation. The time management unit includes means for subdividing an associated multiplex time frame into a predeterminable number of time slots,  $N$ ; means for assigning a first subset,  $K$ , of the time slots exclusively to one transmission direction, and means for assigning a second subset,  $N-K$ , of the time slots comprising the remaining number of time slots in the multiplex time frame exclusively to the other transmission direction. The system also includes a transmitter that transmits the digital data bidirectionally between the first station and the second station via the two-wire line utilizing the subdivided multiplex time frame, wherein only one of a transmitting operation and a receiving operation is performed at any given time in each station.

Like claim 8 above, Grube fails to show the recited features of means for time division multiplexing of the DMT information, means for subdividing a multiplex frame into slots for transmission in each direction, and means for controlling the transmitter and receiver in each station so that they do not operate at the same time. Yong also fails to disclose time division multiplexing over a twisted pair using DMT transmitters and receivers. Therefore, the withdrawal of the rejection and the allowance of amended claim 11 are respectfully requested.

In paragraph 9 of the Office Action, the Examiner rejected claim 3 under 35 U.S.C. § 103(a) as being unpatentable over Grube and Yong as applied to claim 8, and further in view of Kageyama (US 4,144,522). Claim 3 depends from claim 8 and recites that a predeterminable number of time slots for Automatic Repeat Request transmission repeats are provided on average over time in the multiplex time frame of the data transmission. The Examiner stated that Grube and Yong show the claimed invention except for storing a transmission data into a buffer for transmitting to the receiving node and using ARQ method. The Examiner contends this is shown by Kageyama. However, as noted above, Grube and Yong do not teach the invention recited in base

claim 8. The combination with Kageyama's ARQ method does not cure this deficiency. Therefore, the allowance of dependent claim 3 is respectfully requested.

In paragraph 10 of the Office Action, the Examiner rejected claims 4-5 under 35 U.S.C. § 103(a) as being unpatentable over Grube and Yong as applied to claim 8, and further in view of Huebner (US 3,798,608). Claims 4-5 depend from amended claim 8 and recite further limitations in combination with the novel elements of claim 8. As noted above, Grube and Yong do not teach the invention recited in base claim 8. The combination with Huebner does not cure this deficiency. Therefore, the allowance of dependent claims 4-5 is respectfully requested.

In paragraph 11 of the Office Action, the Examiner rejected claims 6 and 10 under 35 U.S.C. § 103(a) as being unpatentable over Grube and Yong as applied to claim 8, and further in view of Cioffi (US 5,625,651). Claims 6 and 10 depend from amended claim 8 and recite further limitations in combination with the novel elements of claim 8. As noted above, Grube and Yong do not teach the invention recited in base claim 8. The combination with Cioffi does not cure this deficiency. Therefore, the allowance of dependent claims 4-5 is respectfully requested.

In paragraph 12 of the Office Action, the Examiner rejected claim 7 under 35 U.S.C. § 103(a) as being unpatentable over Grube and Yong as applied to claim 8, and further in view of Bowman (US 5,151,896). As noted above, Grube and Yong do not teach the invention recited in base claim 8. The combination with Bowman does not cure this deficiency. Therefore, the allowance of dependent claim 7 is respectfully requested.

The Applicant has added new claims 12-14. Claims 12 and 13 depend from base claim 11 and recite further limitations in combination with the novel elements of system claim 11. Claim 14 depends from base claim 8 and recites further limitations in combination with the novel elements of method claim 8. Therefore, the allowance of dependent claims 12-14 is respectfully requested.

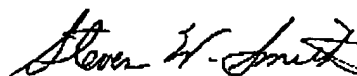
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**CONCLUSION**

Through the above Amendment, the Applicant has made a genuine effort to place the application in condition for allowance. Entry of the Amendment and consideration of the Remarks is respectfully requested. The Applicant contends that the claim amendments are merely clarifying amendments, and they do not raise new issues. The Remarks specifically point out areas in which the cited references fail to establish a prima facie case of obviousness. The Applicant, therefore, respectfully requests that the Examiner withdraw all rejections and issue a Notice of Allowance for claims 2-14.

The Applicant requests a telephonic interview if the Examiner has any questions or requires any additional information that would further or expedite the prosecution of the Application.

Respectfully submitted,



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